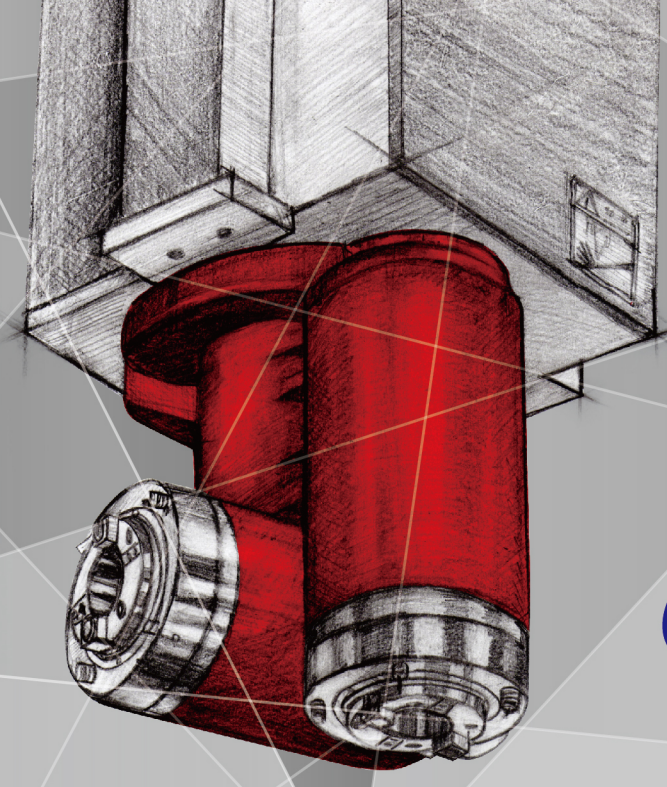
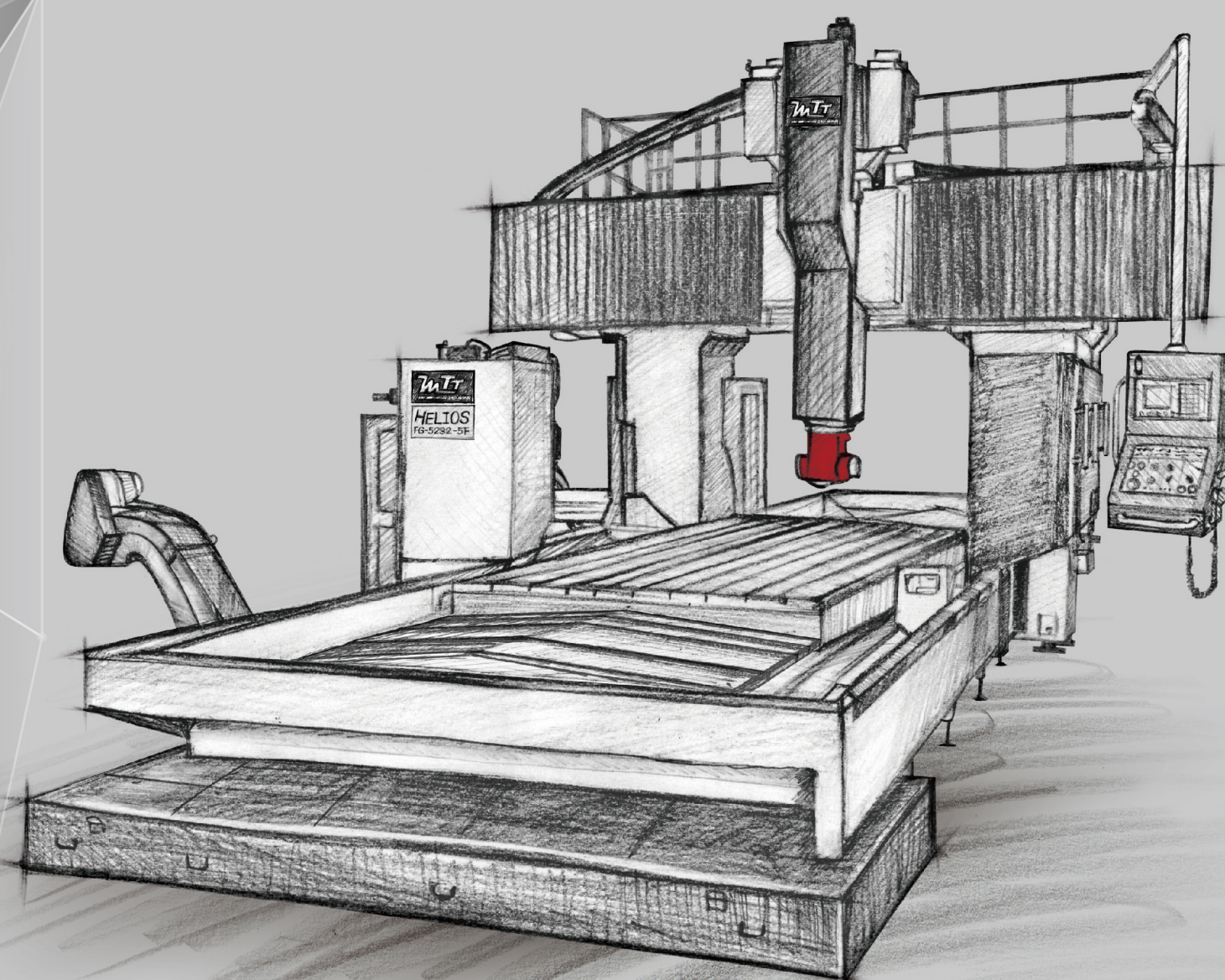


SOLUTION OF WORLDWIDE SALES NETWORK



# HELIOS Series

5 Face Bridge Type Machining Center



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# HELIOS Series

## 5 Face Bridge Type Machining Center

### Widely used in various fields

- automotive industry, railway industry, shipbuilding industry
- Construction Machinery, petrochemical industry, aerospace industry
- Military Enterprise

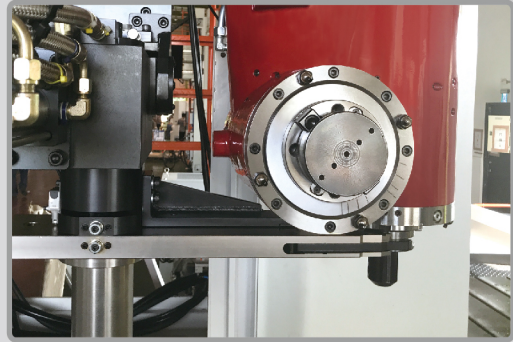


◀ 5 Face Double Column  
Machining Center-VIDEO

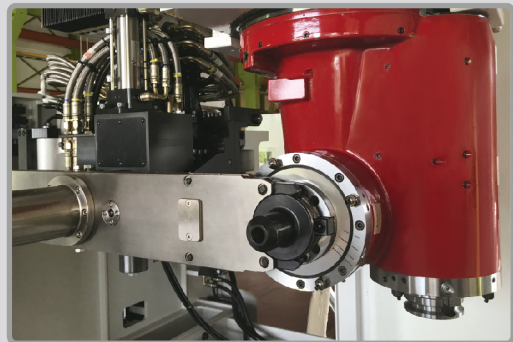
FG-5232-5F  
Semi-enclosed splash guard



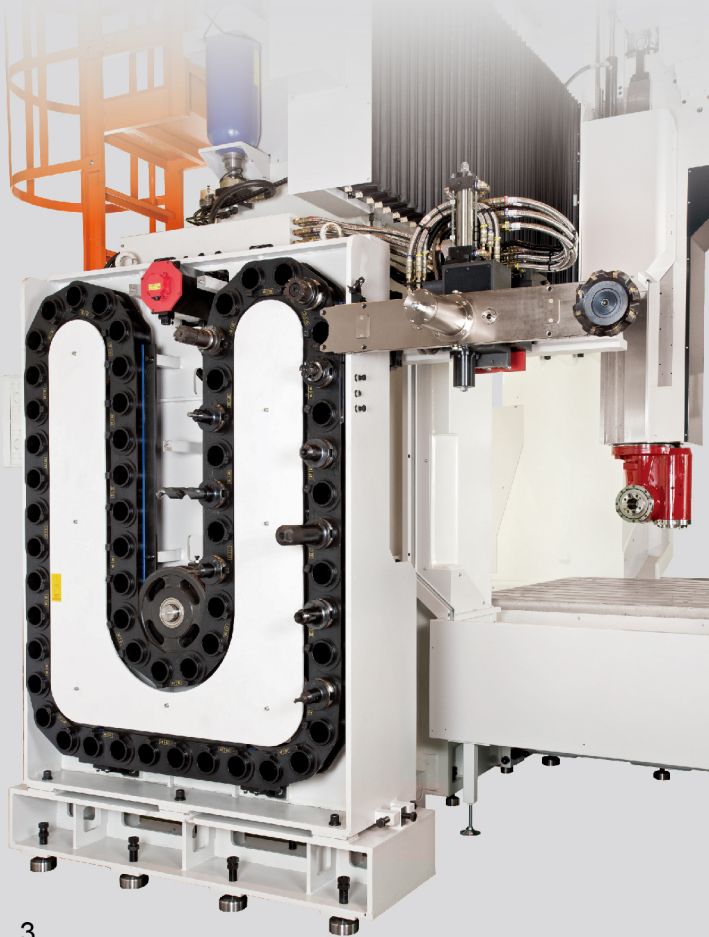
**Combined vertical & horizontal milling head, Servo driven tool indexing to reduce tool changing time.**



Vertical tool Change



Horizontal tool Change



## Structural characteristic



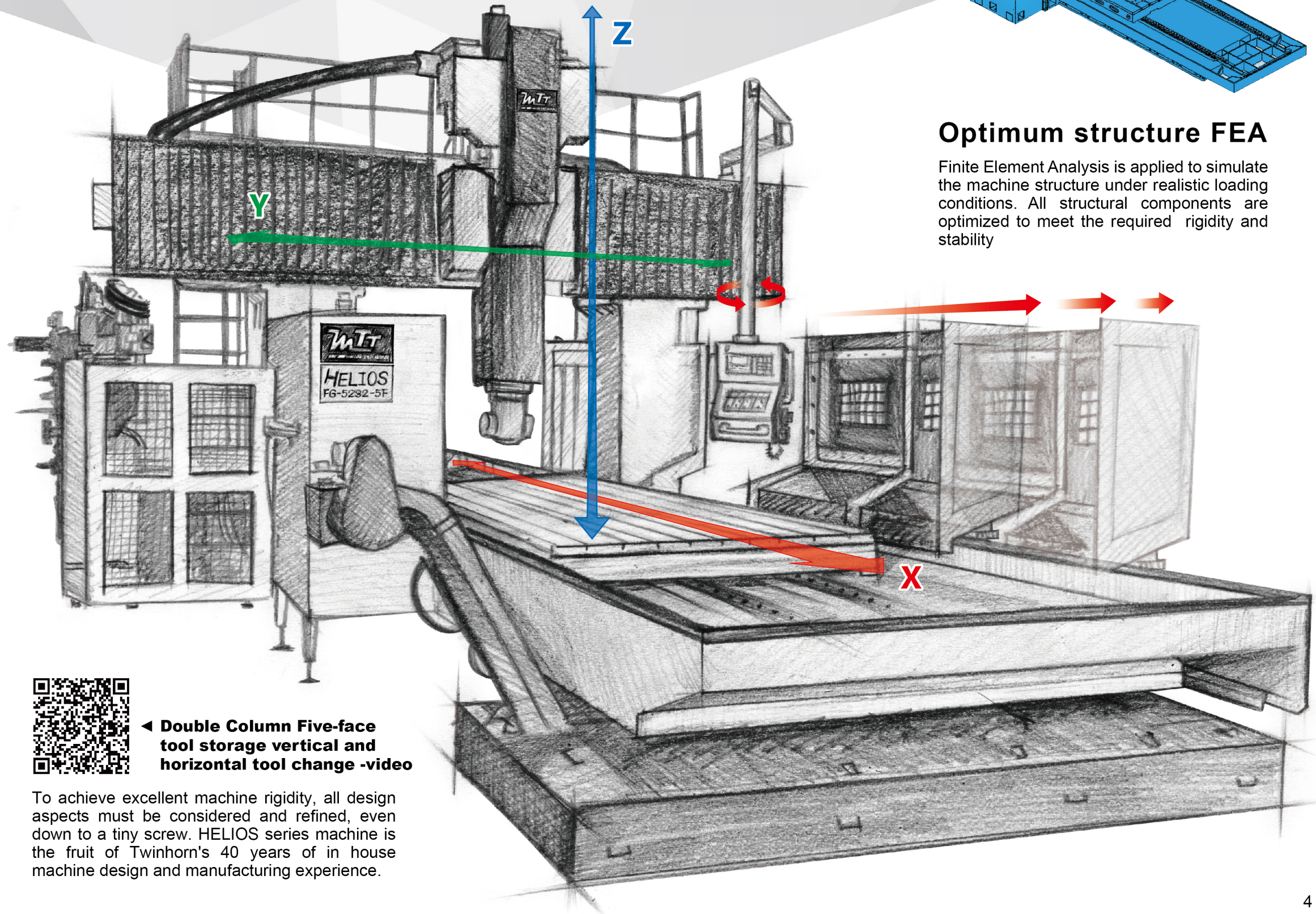
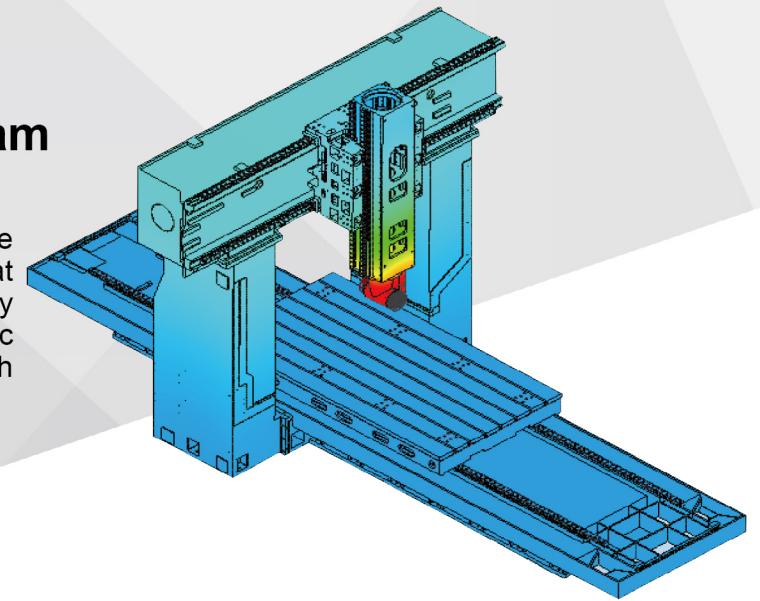
### High rigidity cross-roller linear guides

X, Y, Z Axes adopts rigid, high-precision and smooth running guide ways. Multiple blocks and guide ways along the same axis enhance the static and dynamic loading capacity, thus guarantee accuracy and long service life.



### High rigidity crossbeam structure design

The multi-layered steel column structure is specially reinforced and widened at the base to achieve the stability, rigidity and vibration damping characteristic required during high precision and high chip removal rate operations.



### Optimum structure FEA

Finite Element Analysis is applied to simulate the machine structure under realistic loading conditions. All structural components are optimized to meet the required rigidity and stability

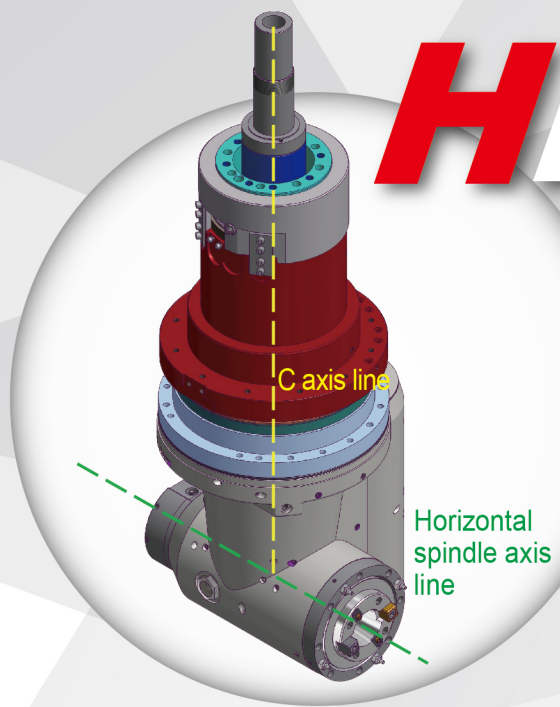


◀ **Double Column Five-face tool storage vertical and horizontal tool change -video**

To achieve excellent machine rigidity, all design aspects must be considered and refined, even down to a tiny screw. HELIOS series machine is the fruit of Twinhorn's 40 years of in house machine design and manufacturing experience.

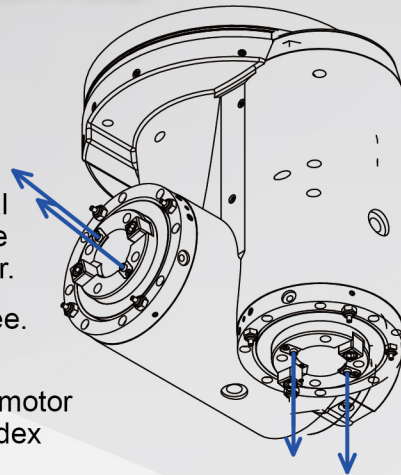


# HELIOS Series

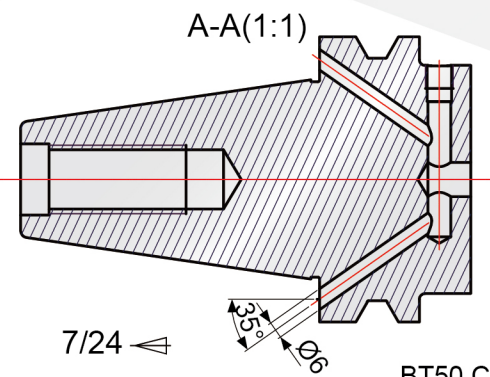


## High performance five-face milling head

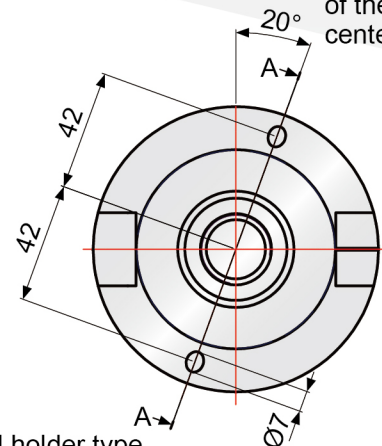
- Combined vertical & horizontal milling head, horizontal spindle center is aligned with C-axis center.
- C-axis rotating range  $\pm 185$  degree.
- C-axis positioning:  
Standard:  $5^\circ$  indexed by spindle motor  
Optional:  $0.001^\circ$ , independent index



Schematic diagram of the coolant through center outlet



BT50 Coolant through tool holder type  
DIN 69871 B Type

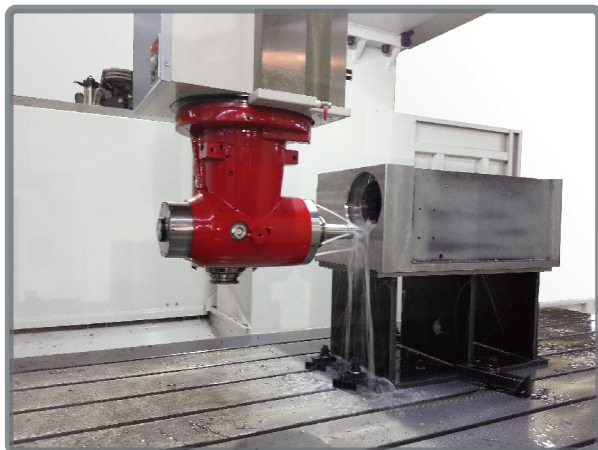


## Machining capabilities

| DRILING               |                |
|-----------------------|----------------|
| Cutting specification | Ø40 mm, HSS    |
| Workpiece material    | S45C (HRC 18°) |
| Spindle speed         | 253 rpm        |
| Feed rate             | 101 mm/min     |
| Material removal rate | 127 cc/min     |
| Spindle load          | 80 %           |

| FACE MILLING          |                                   |
|-----------------------|-----------------------------------|
| Cutting specification | Ø160 mm Face mill cutter, Dry cut |
| Workpiece material    | S45C (HRC 18°)                    |
| Spindle speed         | 320 rpm                           |
| Feed rate             | 1250 mm/min                       |
| Cutting width         | 135 mm                            |
| Cutting depth         | 5 mm                              |
| Material removal rate | 844 cc/min                        |
| Spindle load          | 123 %                             |

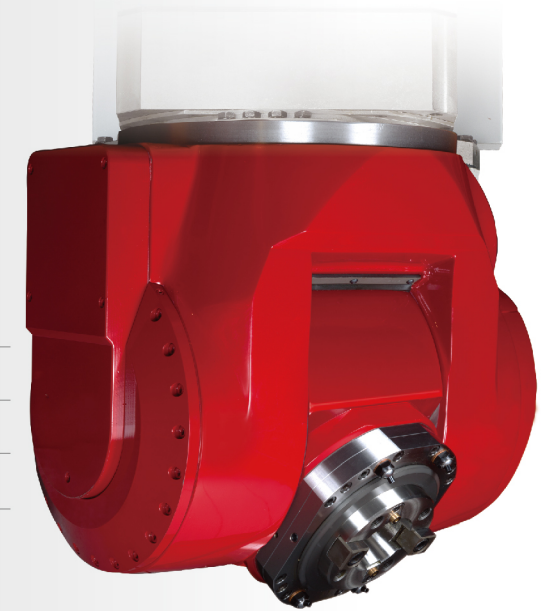
| TAPPING               |                                   |
|-----------------------|-----------------------------------|
| Cutting specification | M30P3.5 spiral wire tapping (HSS) |
| Workpiece material    | S45C (HRC 18°)                    |
| Spindle speed         | 200 rpm                           |
| Feed rate             | 700 mm/min                        |
| Tooth size            | 3.5 mm                            |
| Spindle load          | 38 %                              |



## 5-axis milling head (TTFG1) 4-axis simultaneous

Sturdy, accurate, efficient adaptable design.

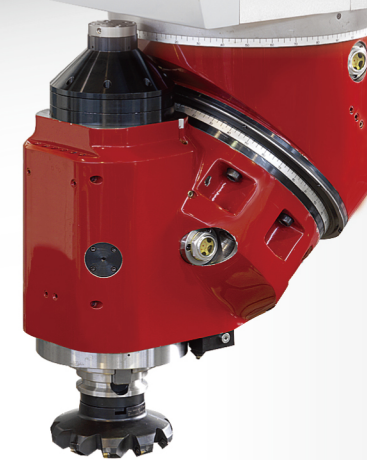
|                            |  |
|----------------------------|--|
| C-axis travel              | $\pm 200^\circ$ 1470/3670 Nm           |
| B-axis travel              | $\pm 95^\circ$ 1470/3670 Nm            |
| B-axis resolution          | 0.001° (index)                         |
| C-axis resolution          | $5^\circ$ , opt. $0.001^\circ$ (cont.) |
| Spindle type               | 4000 rpm BT-50(DIN-50)<br>Gear-driven  |
| Spindle power (S1)         | 34 kw (380 V)                          |
| Spindle torque (S1/S6-40%) | 860/1100 Nm                            |



## Universal milling Head (TT2i)

Simple, accurate and adaptable universal head.

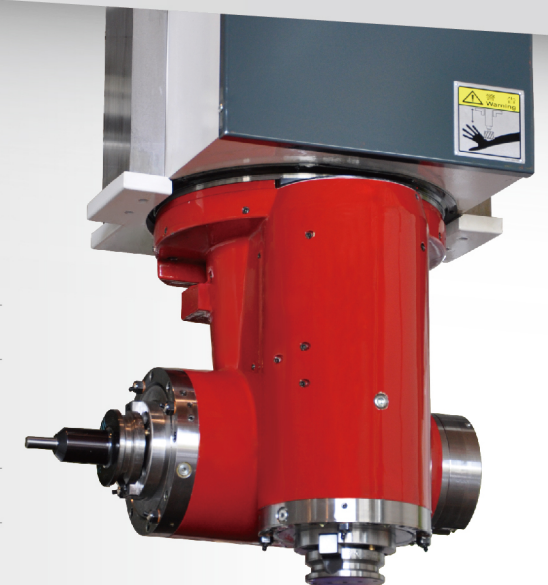
|                            |   |
|----------------------------|---|
| B-axis travel              | $0\sim 90^\circ$                                |
| C-axis travel              | $\pm 185^\circ$ , 1200/1700 Nm                  |
| B-axis resolution          | $2.5^\circ$ (index), opt. $0.001^\circ$ (index) |
| C-axis resolution          | $5^\circ$ , opt. $0.001^\circ$ (cont.)          |
| Spindle type               | 5000 rpm BT-50(DIN-50)<br>Gear-driven           |
| Spindle power (S1)         | 37 kw (380 V)                                   |
| Spindle torque (S1/S6-40%) | 500/700 Nm(S1/S6-40%)                           |



## 5-face milling Head (TT2S)

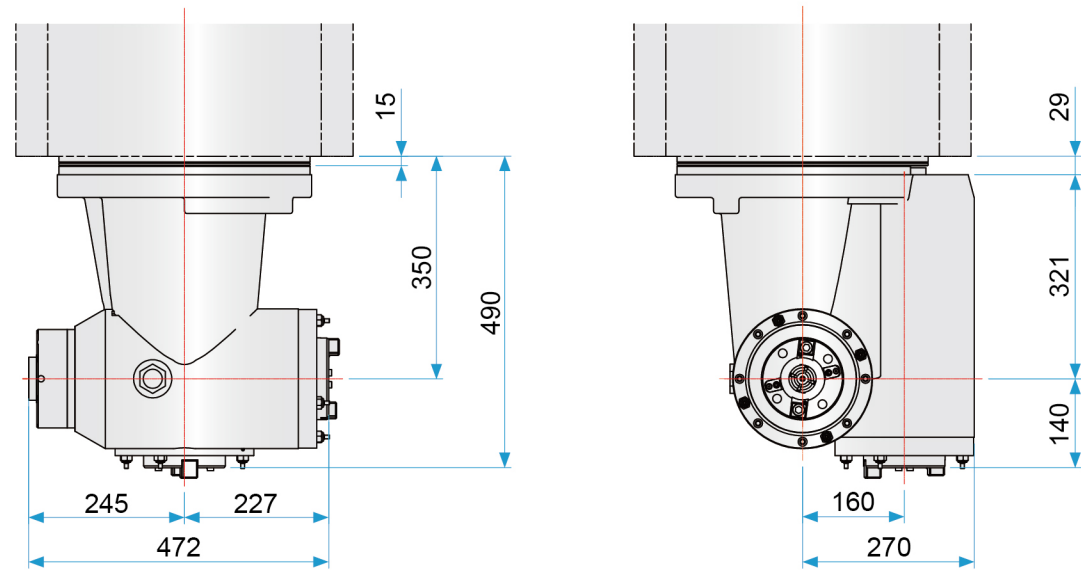
Rigidity being optimized while remaining slim.  
Best suited for multiple face milling operation.

|                            |  |
|----------------------------|--|
| C-axis travel              | $\pm 185^\circ$ , 1200/1700 Nm         |
| C-axis resolution          | $5^\circ$ , opt. $0.001^\circ$ (cont.) |
| Spindle type               | 4000 rpm BT-50(DIN-50)<br>Gear-driven  |
| Spindle power (S1/S3-25%)  | 18.5/30 kw (220 V)                     |
| Spindle torque (S1/S3-25%) | 698/1130 Nm                            |

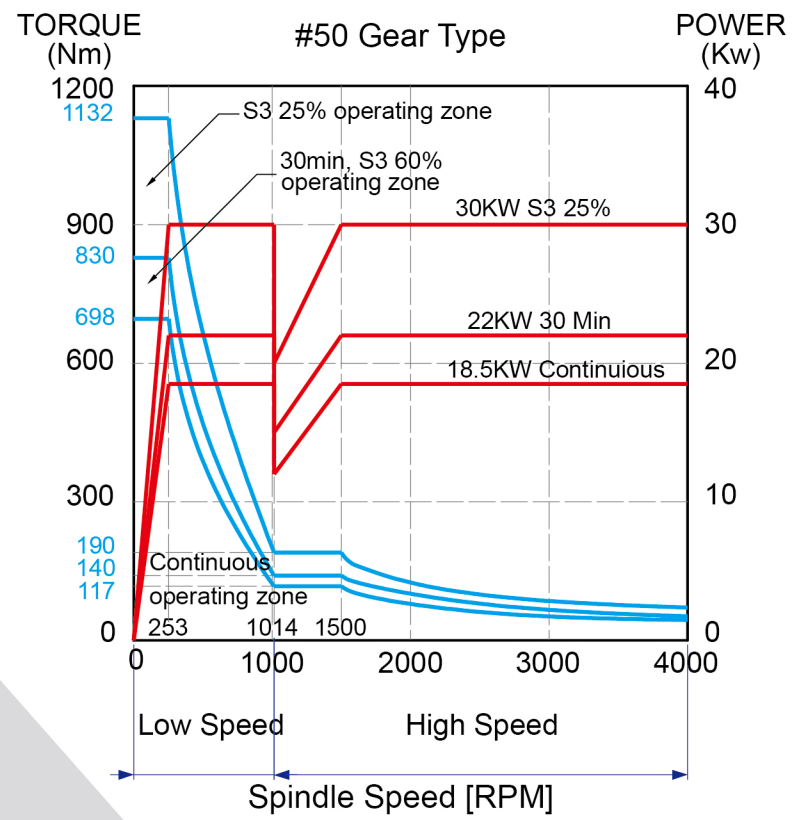




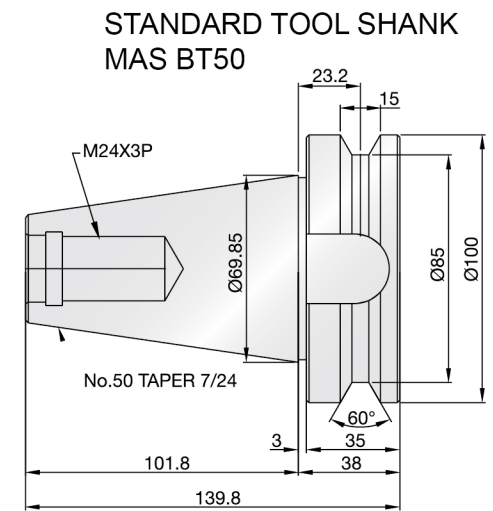
### Vertical-horizontal head + C-axis Outline diagram



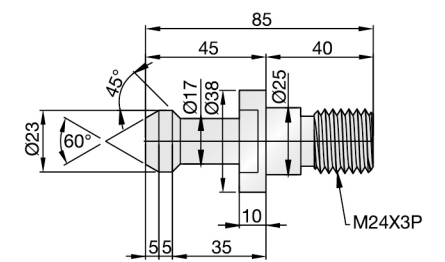
### Output Power-Speed & Torque-Speed Characteristic



### Pull Stud and Tool Shank dimensions



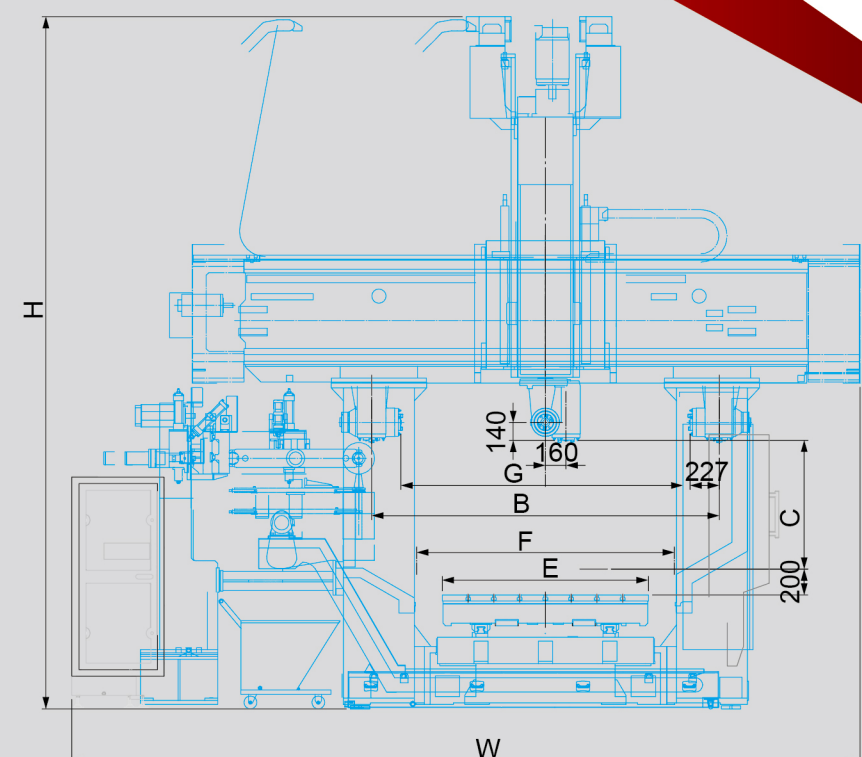
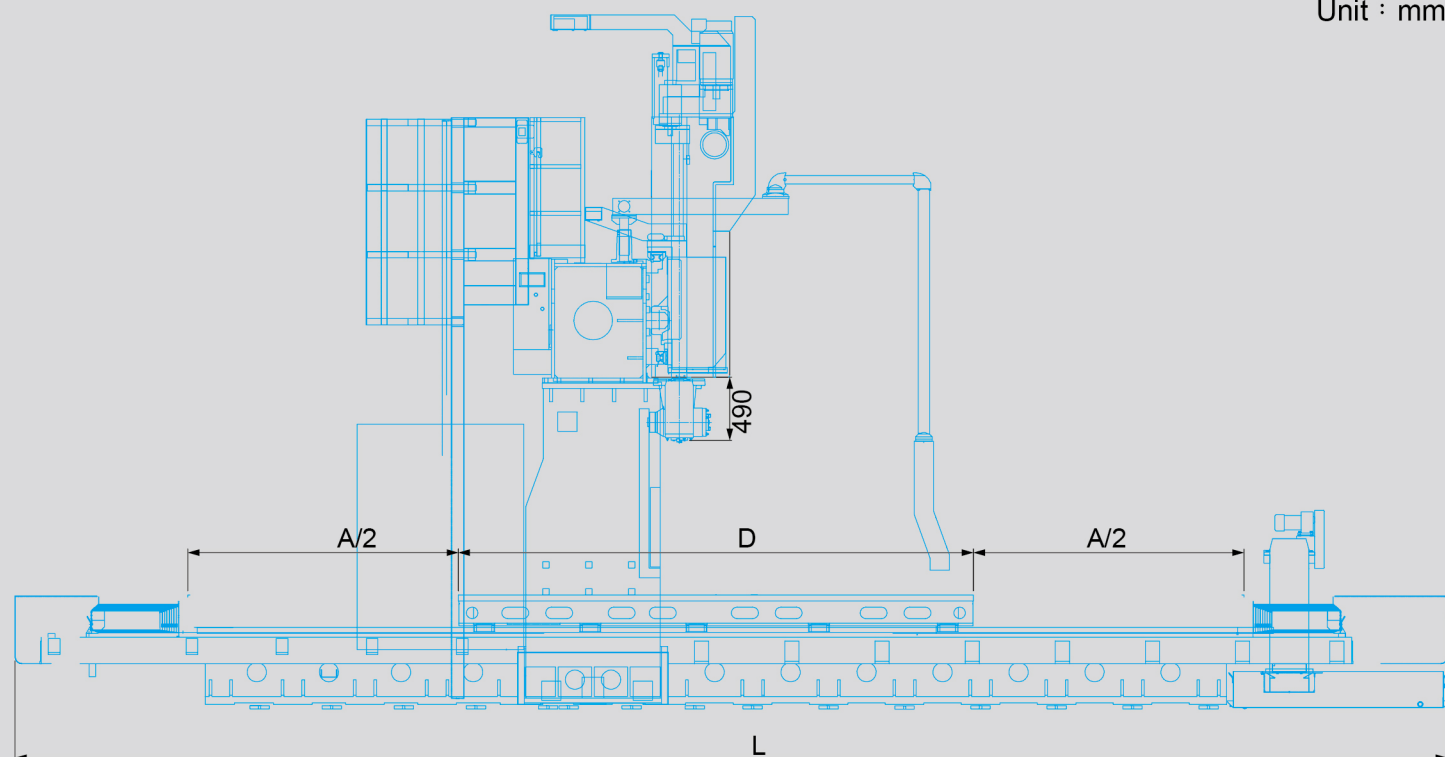
### STANDARD PULL STUD MAS 403-P50T-1



### 5 Face Bridge Type Machining Center external Dimension Chart

| Dimension code                                  | FG-3227/4227-5F | FG-4232/5232/6232-5F | FG-4237/5237/6237/8237-5F | FG-6242/8242-5F |
|---|-----------------|----------------------|---------------------------|-----------------|
| A (X-axis travel)                               | 3200/4200       | 4200/5200/6200       | 4200/5200/6200/8200       | 6200/8200       |
| B (Y-axis travel)                               | 2700            | 3200                 | 3700                      | 4200            |
| C (Z-axis travel)                               | 1000            |                      |                           |                 |
| D (Table length)                                | 3000/4000       | 4000/5000/6000       | 4000/5000/6000/8000       | 6000/8000       |
| E (Table width)                                 | 1600            | 2000                 | 2500                      | 3000            |
| F (Distance between two columns)                | 2000            | 2500                 | 3000                      | 3500            |
| G (Maximum distance between horizontal spindle) | 2246            | 2746                 | 3246                      | 3746            |
| L (Machine length)                              | 8990/11125      | 8990/11125/15000     | 8990/11125/15000/20000    | 15000/20000     |
| W (Machine width)                               | 5900            | 6450                 | 6950                      | 7500            |
| H (Machine height)                              | 5400            | 5450                 | 5525                      | 5600            |

Unit : mm





# MACHINE SPECIFICATION

| MODEL  |                   | FG-3227-5F                         | FG-4227-5F | FG-4232-5F   | FG-5232-5F                         | FG-6232-5F | FG-4237-5F                | FG-5237-5F                         | FG-6237-5F | FG-8237-5F                 | FG-6242-5F | FG-8242-5F |          |
|--|-------------------|------------------------------------|------------|--------------|------------------------------------|------------|---------------------------|------------------------------------|------------|----------------------------|------------|------------|----------|
| <b>Travel</b>  |                   |                                    |            |              |                                    |            |                           |                                    |            |                            |            |            |          |
| X-axis travel  | mm                | 3200                               | 4200       | 4200         | 5200                               | 6200       | 4200                      | 5200                               | 6200       | 8200                       | 6200       | 8200       |          |
| Y-axis travel  | mm                | 2700                               |            | 3200         |                                    |            | 3700                      |                                    |            | 4200                       |            |            |          |
| Z-axis travel  | mm                | 1000                               |            |              |                                    |            |                           | 1000                               |            |                            |            |            |          |
| Vertical spindle nose end to worktable surface                   | mm                | 200~1200                           |            |              |                                    |            |                           | 200~1200                           |            |                            |            |            |          |
| Distance from horizontal spindle center end to worktable surface | mm                | 340~1340                           |            |              |                                    |            |                           | 340~1340                           |            |                            |            |            |          |
| Distance between two columns                                     | mm                | 2000                               |            | 2500         |                                    |            | 3000                      |                                    |            | 3500                       |            |            |          |
| <b>Table</b>   |                   |                                    |            |              |                                    |            |                           |                                    |            |                            |            |            |          |
| Table size (X direction)   | mm                | 3000                               | 4000       | 4000         | 5000                               | 6000       | 4000                      | 5000                               | 6000       | 8000                       | 6000       | 8000       |          |
| Table size (Y direction)   | mm                | 1600                               |            | 2000         |                                    |            | 2500                      |                                    |            | 3000                       |            |            |          |
| T-slot (No. x size x distance)                                   |                   | 7×22mm×200mm                       |            | 9×22mm×200mm |                                    |            | 9×28mm×250mm+2×28mm×150mm |                                    |            | 11×28mm×250mm+2×28mm×150mm |            |            |          |
| Max. Table load  | kg                | 10000                              | 12000      | 15000        | 18000                              | 20000      | 18000                     | 22000                              | 25000      | 30000                      | 30000      | 35000      |          |
| <b>Spindle</b>   |                   |                                    |            |              |                                    |            |                           |                                    |            |                            |            |            |          |
| Spindle taper  |                   | BT50                               |            |              |                                    |            |                           | BT50                               |            |                            |            |            |          |
| Spindle speed  | min <sup>-1</sup> | 4000                               |            |              |                                    |            |                           | 4000                               |            |                            |            |            |          |
| Spindle diameter   | mm                | 90                                 |            |              |                                    |            |                           | 90                                 |            |                            |            |            |          |
| C axis rotation angle  | deg.              | ±185°, 5°(index)                   |            |              |                                    |            |                           | ±185°, 5°(index)                   |            |                            |            |            |          |
| <b>Feedrate</b>  |                   |                                    |            |              |                                    |            |                           |                                    |            |                            |            |            |          |
| Rapid feedrate (X/Y/Z)   | m/min             | 15/15/10                           |            |              | 12/15/10                           |            |                           | 15/15/10                           |            | 12/15/10                   | 10/15/10   | 12/12/10   | 10/12/10 |
| Cutting rate   | mm/min            | 1-1000                             |            |              |                                    |            |                           | 1-1000                             |            |                            |            |            |          |
| <b>Tool change</b>   |                   |                                    |            |              |                                    |            |                           |                                    |            |                            |            |            |          |
| Number of tool   | pcs               | 60                                 |            |              |                                    |            |                           | 60                                 |            |                            |            |            |          |
| Max. tool diameter/<br>w./w.o. adjacent tool                     | mm                | 125/215                            |            |              |                                    |            |                           | 125/215                            |            |                            |            |            |          |
| Max. tool length   | mm                | 400                                |            |              |                                    |            |                           | 400                                |            |                            |            |            |          |
| Max. tool weight   | kg                | 20                                 |            |              |                                    |            |                           | 20                                 |            |                            |            |            |          |
| Pull stud  |                   | MAS403 P50T-1(45°)                 |            |              |                                    |            |                           | MAS403 P50T-1(45°)                 |            |                            |            |            |          |
| <b>Motor</b>   |                   |                                    |            |              |                                    |            |                           |                                    |            |                            |            |            |          |
| Spindle motor  | kw                | 18.5/30(Cont./S3 25%)(oil18/7000)  |            |              |                                    |            |                           | 18.5/30(Cont./S3 25%)(oil18/7000)  |            |                            |            |            |          |
| Spindle max torque   | N-m               | 1130(S3 25%)                       |            |              |                                    |            |                           | 1130(S3 25%)                       |            |                            |            |            |          |
| Feed motor X/Y/Z(FANUC)  | kw                | (F)6/7/7(A40/A30/A30B)             |            |              |                                    |            |                           | (F)6/7/7(A40/A30/A30B)             |            |                            |            |            |          |
| Tool magazine motor  | kw                | 4.0(α iF22B)                       |            |              |                                    |            |                           | 4.0(α iF22B)                       |            |                            |            |            |          |
| Cutting fluid pump motor   | kw                | 2.6(50HZ)/4(60HZ)                  |            |              |                                    |            |                           | 2.6(50HZ)/4(60HZ)                  |            |                            |            |            |          |
| <b>Accuracy(VDI/DGQ 3441)</b>                                    |                   |                                    |            |              |                                    |            |                           |                                    |            |                            |            |            |          |
| positioning accuracy P(X,Y,Z)                                    | mm                | 0.025                              | 0.030      | 0.030        | 0.035                              | 0.040      | 0.030                     | 0.035                              | 0.040      | 0.050                      | 0.040      | 0.050      |          |
| Repeatability accuracy Ps(X,Y,Z)                                 | mm                | 0.020                              | 0.025      | 0.025        | 0.030                              | 0.035      | 0.025                     | 0.030                              | 0.035      | 0.045                      | 0.035      | 0.045      |          |
| <b>OTHER</b>   |                   |                                    |            |              |                                    |            |                           |                                    |            |                            |            |            |          |
| Power capacity   |                   | 65 kVA, 200/220V, 3 phase 50/60Hz  |            |              |                                    |            |                           | 65 kVA, 200/220V, 3 phase 50/60Hz  |            |                            |            |            |          |
| Air pressure capacity  |                   | 6kg/cm <sup>2</sup>                |            |              |                                    |            |                           | 6kg/cm <sup>2</sup>                |            |                            |            |            |          |
| Each axis guide  |                   | X 2 roller guide, Y 2 roller guide |            |              | X 3 roller guide, Y 2 roller guide |            |                           | X 3 roller guide, Y 2 roller guide |            |                            |            |            |          |
|  |                   | Z Turcite & hardened box rail      |            |              |                                    |            |                           | Z Turcite & hardened box rail      |            |                            |            |            |          |
| Machine dimension(L)   | mm                | 8300                               | 11000      | 11000        | 13000                              | 15000      | 11000                     | 13000                              | 15000      | 20000                      | 15000      | 20000      |          |
| Machine dimension(W×H)   | mm                | 5900×5400                          |            |              | 6450×5450                          |            |                           | 6950×5525                          |            |                            | 7500×5600  |            |          |
| Machine weight   | kg                | 30000                              | 35000      | 36000        | 41000                              | 48000      | 46000                     | 53000                              | 60000      | 75000                      | 62000      | 78000      |          |

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## Standard Accessories

- C-axis 5° (index)
- Half splash guard
- Y-axis bellows folding cover
- X-axis sheet metal telescoping cover
- Toolbox and tools
- Work light
- M30 Automatic power off
- signal light
- Leveling bolts and pads
- Spindle cooling system
- Coolant system
- Centralized lubrication system
- Electric cabinet heat exchanger
- Chip removal system and cart

## Option Accessories

- Coolant through spindle
- Axes linear scale
- Auto tool length measurement device
- C-axis 0.001° (cont.)
- Auto workpiece measurement device
- Arm type magazine 80, 120 tools storage
- Electric cabinet air conditioner
- Transformer

## Optional controller

- FANUC 0iMF
- MITSUBISHI M830S
- SIEMENS 840Dsl
- HEIDENHAIN TNC640